

AMENDMENTS TO THE SPECIFICATION:

[0008] In the first aspect, the elastic plastic foam sheet has a polishing layer which is disposed inside the surface layer. Since a surface of the elastic plastic foam sheet is approximately flat due to the surface layer, the polishing sheet can polish a material to be polished with the flat surface layer, and after the surface layer is worn away, the polishing sheet can continue to polish the material to be polished with the polishing layer. Since the polishing layer has the approximately uniform foam structure in the direction of the thickness of the elastic plastic foam sheet by being formed foams whose space volume is larger than that of foams formed at the surface layer and which are communicated so as to form the network by continuous holes whose diameter is smaller than that of ~~the space volume~~ an average diameter of the foams formed at the polishing layer, a polishing liquid containing abrasive particles is reserved by the foams which are uniformly formed at the polishing layer and is supplied to a polishing face of the material to be polished through the continuous holes at a time of polishing the material to be polished. Accordingly, the face of the material to be polished is polished uniformly and waviness to the face of the material to be polished can be improved. Further, since the polishing layer is allowed to wear away by polishing and its thickness is larger than that of the surface layer, even if the polishing layer is worn away partially by polishing, the polishing sheet can polish the material to be polished continuously due to the thickness of the polishing layer. Accordingly, a polishing sheet having a long life can be obtained.

[0013] A second aspect of the present invention is directed to a manufacturing method of an elastic plastic foam sheet for a polishing sheet, comprising the steps of; coating approximately uniformly a polyurethane resin emulsion, which includes a polyurethane resin, a first organic solvent that the polyurethane resin can be dissolved, and a second organic solvent whose solubility to water is smaller than that of the first organic solvent and which controls coagulation of the polyurethane resin, to a base material; and soaking the base material coated by the polyurethane resin emulsion into a coagulation liquid whose main component is water, and wherein the elastic plastic foam sheet has a polishing layer which is

disposed inside a surface layer and which is allowed to wear away by polishing and whose thickness is larger than a thickness of the surface layer, and the polishing layer has an approximately uniform foam structure in a direction of the thickness of the elastic plastic foam sheet by being formed foams whose space volume is larger than that of foams formed at the surface layer and which are communicated so as to form a network by continuous holes whose diameter is smaller than that of ~~the space volume~~ an average diameter of the foams formed at the polishing layer.

[0014] In the second aspect of the present invention, since the second organic solvent is restricted to elute into the coagulation liquid whose main component is water due to that the second organic solvent included in the polyurethane resin emulsion is smaller in solubility to water than the first organic solvent, a speed of substitution between the second organic solvent and the coagulation liquid is delayed so that coagulation of polyurethane resin progresses approximately uniformly. Accordingly, the polishing sheet, where the polishing layer is disposed inside a surface layer and the polishing layer has an approximately uniform foam structure in a direction of the thickness of the elastic plastic foam sheet by being formed foams whose space volume is larger than that of foams formed at the surface layer and which are communicated so as to form a network by continuous holes whose diameter is smaller than that of ~~the space volume~~ an average diameter of the foams formed at the polishing layer, can be obtained.

[0016] Further, a third aspect of the present invention is directed to a manufacturing method of an elastic plastic foam sheet for a polishing sheet, comprising the steps of; coating approximately uniformly a polyurethane resin emulsion, which includes a polyurethane resin and a third organic solvent that the polyurethane resin can be dissolved, to a base material; and soaking the base material coated by the polyurethane resin emulsion into a coagulation liquid including a fourth organic solvent and water, and wherein the elastic plastic foam sheet has a polishing layer which is disposed inside a surface layer and which is allowed to wear away by polishing and whose thickness is larger than a thickness of the surface layer, and the

polishing layer has an approximately uniform foam structure in a direction of the thickness of the elastic plastic foam sheet by being formed foams whose space volume is larger than that of foams formed at the surface layer and which are communicated so as to form a network by continuous holes whose diameter is smaller than that of ~~the space volume~~ an average diameter of the foams formed at the polishing layer.

[0027] <POLISHING PAD>

As shown in Fig. 1, a polishing pad 1 has a polyurethane sheet 2 which is formed by a polyurethane resin and which serves as an elastic plastic foam sheet. A surface layer (skin layer, See numeral 9 in Fig. 6.), at which small foams are formed, is removed from the polishing pad 1. Thus, in this embodiment, the polyurethane sheet 2 constitutes a polishing layer, and the polishing layer once positioned inside the surface layer is exposed at a surface of the polyurethane sheet 2. In the polyurethane sheet 2, foams 3 which are approximately uniformly dispersed in the polyurethane resin. A space volume of the foams 3 is larger than that of the foams formed at the surface layer. These foams 3 are communicated so as to form a network by unillustrated continuous holes whose diameter is smaller than that of ~~the space volume~~ an average diameter of the foams 3. Further, the polyurethane sheet 2 (polishing layer) has an approximately uniform foam structure in a direction of its thickness. The foams 3 positioned at a vicinity of a polishing face P are opened at the polishing face P so as to form open portions 4.

[0042] In the present embodiment, the resin emulsion 45 is obtained by adding the control organic solvent to the polyurethane resin solution. Since the solubility to water of the control organic solvent is smaller than that of the DMF, the elution of the control organic solvent into water (the coagulation liquid 25) delays comparing with that of the DMF. Since the control organic solvent is blended with the resin emulsion 45, an amount of the DMF in the resin emulsion 45 becomes small. Accordingly, the speed of the substitution between the DMF plus the control organic solvent and the coagulation liquid 25 is delayed, so that the formation of the large cells is eliminated. Thus, the polishing layer that a thickness thereof is larger

than that of the skin layer and that the foams 3 are dispersed approximately uniformly is formed inside the skin layer in the polyurethane resin. Because the speed of the substitution between the DMF plus the control organic solvent and the coagulation liquid 25 is low, a space volume of the foams 3 becomes larger than that of the foams formed at the skin layer which is formed soon after soaking into the coagulation liquid 25. Further, since the foams 3 are formed according to the deliquoring of the DMF and the control organic solvent, the foams 3 are communicated so as to form the network by the continuous holes of which diameter is smaller than that of ~~the space volume~~ an average diameter of the foams 3. Therefore, the obtained polyurethane resin has the approximately uniform foam structure in the direction of a thickness thereof and has the approximately uniform foam structure without the large cells within a range of not less than 50 μ m from a surface thereof for polishing the material to be polished.